

Criteria

Quantities

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11.1 General Considerations

The quantities of the various materials involved in the construction of a project are needed for determining the estimated cost of the project and for establishing a base for the contractor's bid and payment.

11.1.1 Cost Estimating Quantities

Quantities for determining cost estimates are often necessary during various stages of project development and required at the completion of the Contract Plans. These quantities are calculated from the best information available at the time (see Chapter 11.2.3). The policy regarding the preparation of quantity calculations is as follows:

A. Conceptual Stage

During the conceptual stage of a project, estimated quantities may be required to arrive at an estimated cost. The need for quantities will be determined by the Bridge Projects Unit.

B. Preliminary Plan Stage

Upon completion of the preliminary plan, estimated quantities may be required to arrive at an estimated cost. The need for quantities will be determined by the Bridge Projects Unit.

C. Design Stage

If requested, quantity calculations shall be made, reviewed, and submitted to the Bridge Projects Unit by the Bridge Design Unit as the design progresses. The first submittal of estimated quantities shall be made as soon as the major dimensions of the structure are determined. As refinements in the design are made, quantities varying more than 10 percent from those previously submitted shall be resubmitted.

D. Final Contract Quantities

Upon completion of structural design and plans, the quantities of materials involved in the construction of the project shall be computed.

11.1.2 Not Included in Bridge Quantities

Items of work which appear in the bridge plan sheets, but for which details, specifications, and quantities are supplied by the district, shall be listed in the "Not Included in Bridge Quantities List" (Form 230-038). This list is required for every bridge, even if no items of work are in the Plans that are in this category. (In this case, fill out the bridge information at the top of the form and write "NONE" across the form.) This form is transmitted to other agencies for further processing. Particular care shall be taken in the preparation of this list as omissions result in inaccurate quantities and frequently necessitate construction change orders.

11-1:P:BDM11

11.2 Computation of Quantities

11.2.1 Responsibilities

A. Design Unit

The Design Unit is responsible for alerting the Bridge Projects Unit when alterations are made after turn-in to the design features and quantities which will affect the cost of the structure.

B. Bridge Projects Unit

The Bridge Projects Unit will not be responsible for computing quantities. However, they will be responsible for ensuring that the quantities listed in the Bid Proposal correspond to those received from the Design Unit.

11.2.2 Procedure for Computation

Quantities are to be computed and checked independently. The originator and checker shall separately summarize their results on Form 230-031 "Bridge Quantities" in the units shown thereon. The two summaries shall be submitted to the Design Unit Supervisor for comparison. The originator and checker shall use identical breakdowns for each quantity. For example, the originator's figures for excavation for each of Piers 1, 2, and 3 should be compared separately against the corresponding figures made by the checker. When the desired accuracy is achieved, a Supervisor's Bridge Quantities form shall be prepared. (This form is the same as previously mentioned except that it is labeled "Supervisor's Bridge Quantities" and is completed by the supervisor or his designee. If the supervisor elects, the originator's or the checker's Bridge Quantities form may be designated as "Supervisor's Bridge Quantities.") This form is used by the Bridge Projects Unit to prepare the final bridge cost estimate.

All quantity calculations and bridge quantities forms are to be filed in the job file. All subsequent revisions shall be handled in the same manner as the original quantities. On the "Bridge Quantities" form, any revision to the original figure should not be erased but crossed out and replaced by the new figure using a different colored pencil. If there are too many revisions, the old summary sheet should be marked void, left in the file, and a new sheet made out, marked "Revised," dated, and the original forwarded to the Bridge Projects Unit.

Mistakes in quantities can be very costly to the department. The originator and checker must account for all items of work on the "Bridge Quantities" form but must also be careful to enter an item of work only once (e.g., concrete or steel rebar in the superstructure should not be entered both in the lump sum superstructure breakdown and in the unit bid item quantity).

11.2.3 Data Source

Quantities of materials for use in preliminary cost estimates can often be obtained from the materials calculated for previous similar designs. This information is available from the Bridge Projects Unit.

11.2.4 Accuracy

A. Preliminary Quantities

Quantities used for cost estimates during the conceptual stage of the design are expected to have an accuracy of ± 10 percent. The first iteration of quantities, after the preliminary plan has been completed, is expected to have an accuracy of ± 5 percent.

B. Final Quantities

Final quantities to be listed in the Special Provisions and Bid Proposal sheet are to be calculated to have an accuracy of ± 1 percent, including bar list.

11.2.5 Excavation

A. Structure Excavation, Class A

Excavation necessary for the construction of bridge piers and reinforced concrete retaining walls is classified as Structure Excavation, Class A. Payment for such excavation is generally at the unit contract price per cubic yard. The quantity of excavation to be paid for is measured as outlined in Section 209.4 of the Standard Specifications. Computation of the quantity shall follow the same provisions. Designers shall familiarize themselves with this section of the *Standard Specifications*. Any limits for structure excavation not conforming to the limits specified in the *Standard Specifications* shall be shown in the Plans.

Structure excavation for footings and seals shall be computed using a horizontal limit of 1 foot 0 inches outside and parallel to the neat lines of the footing or seal or as shown in the Plans. The upper limit shall be the ground surface or stream bed as it exists at the time the excavation is started. See Figure 11.2.6-1(A), (B), and (C).

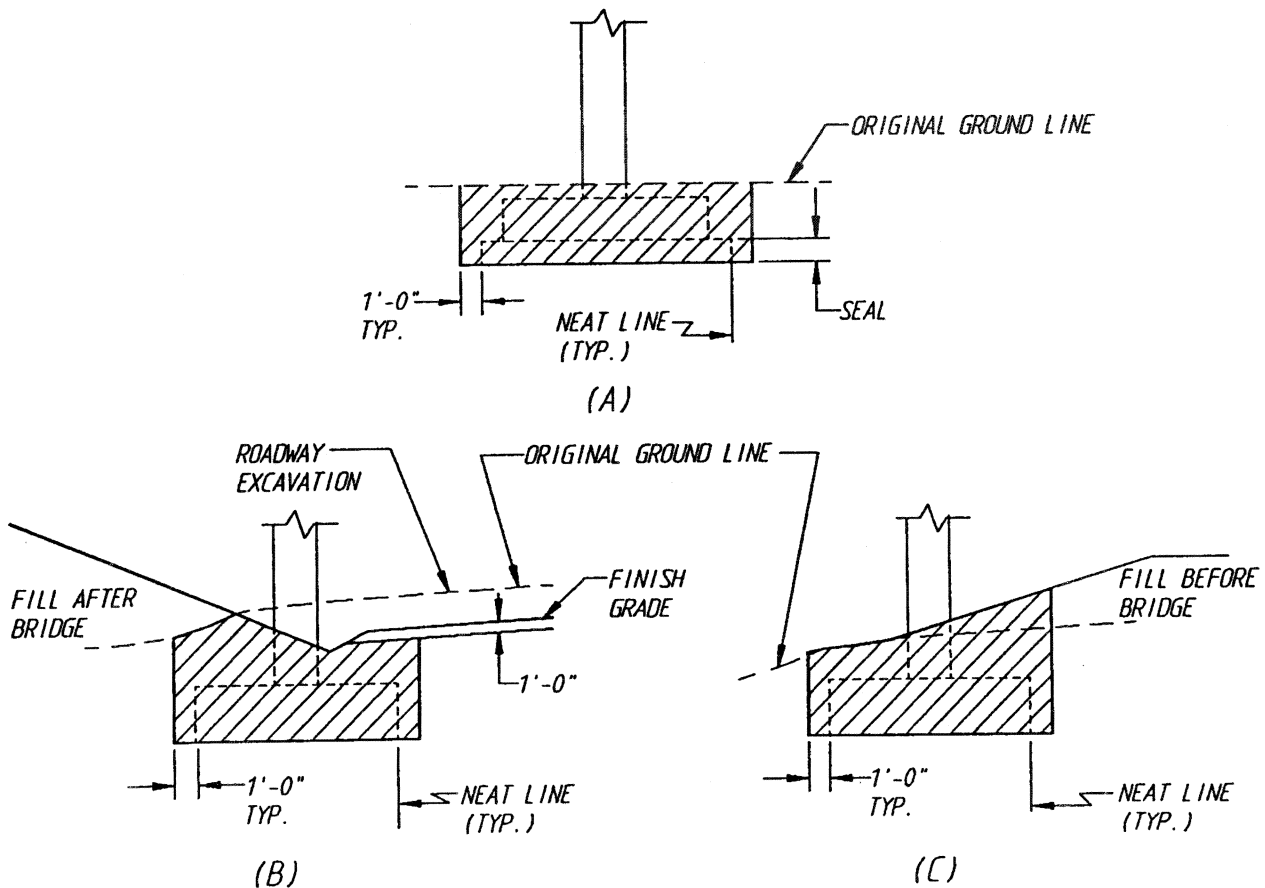


Figure 11.2.6-1

Structure excavation for the construction of wing walls shall be computed using limits shown in Figure 11.2.6-2.

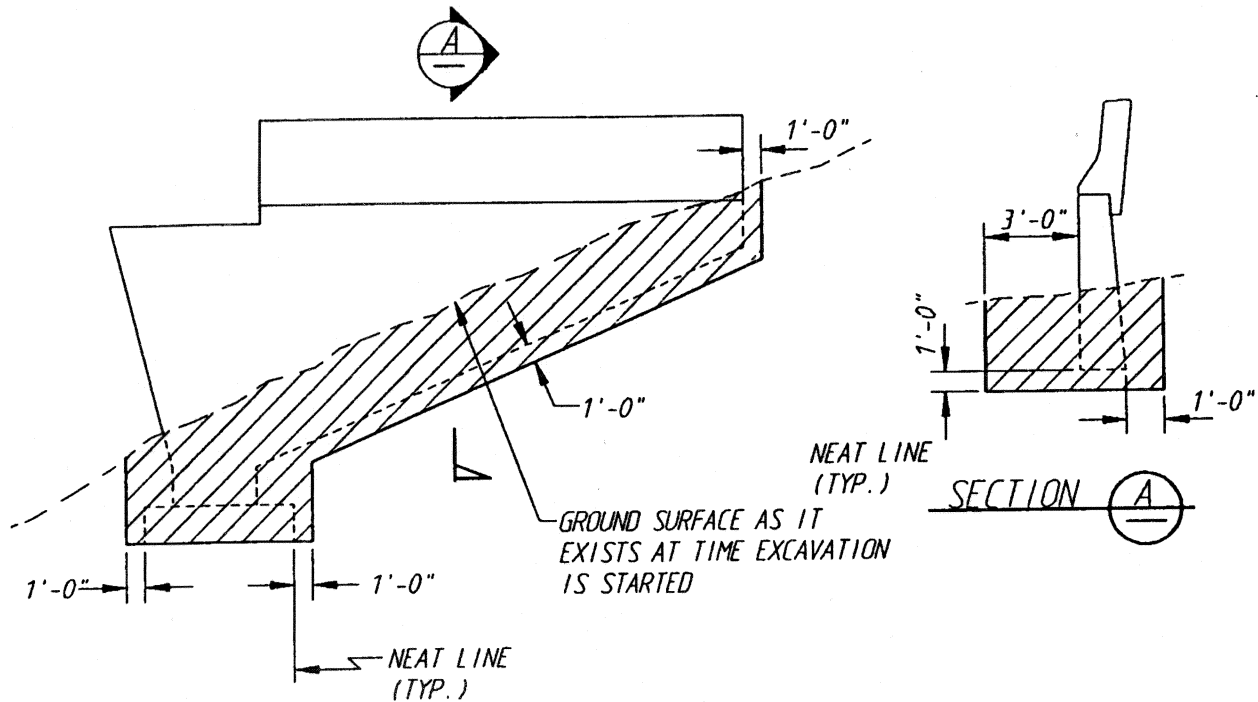


Figure 11.2.6-2

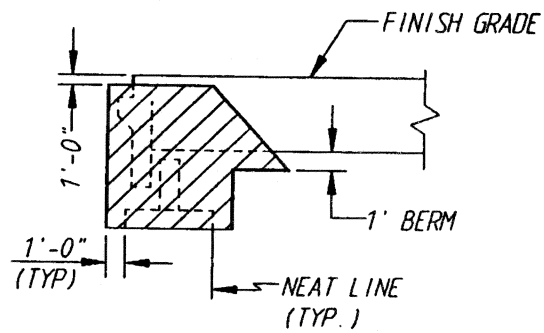


Figure 11.2.6-3

When bridge approach fills are to be constructed in the same contract as the bridge and the foundation conditions do not require full height fills to be placed prior to the construction of the pier, the approach fill is constructed in two stages, i.e., constructed up to the bottom of footing or 1 foot above the bottom of footing and then completed after the bridge construction. (The Materials Laboratory shall be consulted on the staging method.) The structure excavation shall be computed from the top of the first stage fill.

The bottom of a spread footing will be placed 1 foot 0 inches below the top of the first stage fill. See Figure 11.2.6-4(A). The bottom of footings supported on piling will be placed at the top of the first stage fill; therefore, no structure excavation is required (see Figure 11.2.6-4(B)).

The limits for stage fills shall be shown in the Plans with the structure excavation, if any.

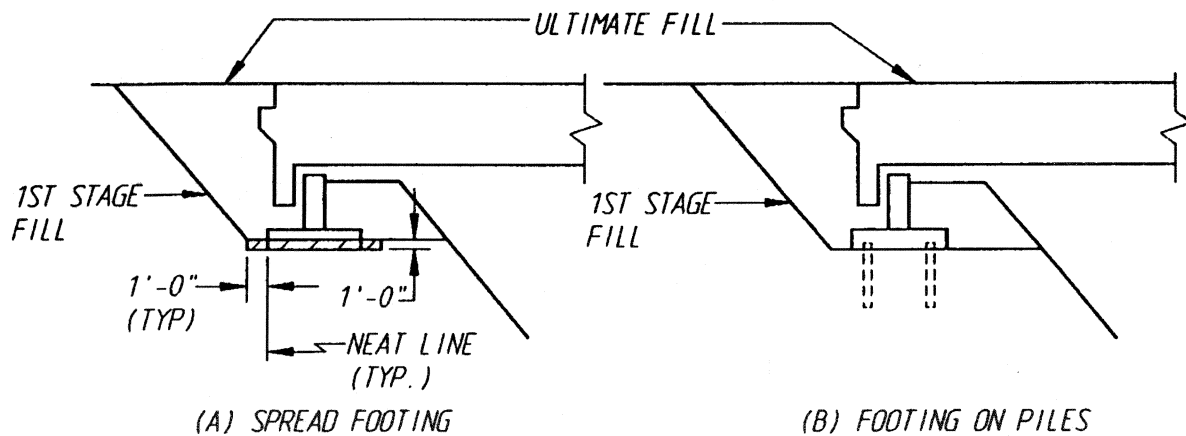


Figure 11.2.6-4

Prior to pier construction, when (1) a full height fill with or without surcharge is required for settlement, or (2) the original ground line is above the finish grade line, structure excavation shall be computed to 1 foot 0 inches below the finish grade (pavement) line (see Figure 11.2.6-5).

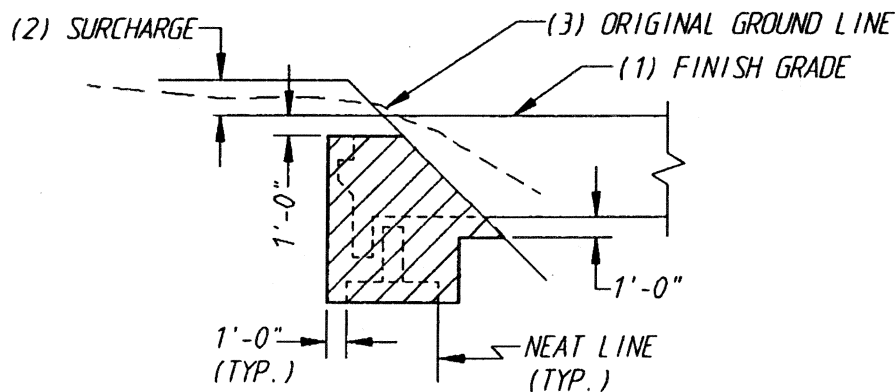


Figure 11.2.6-5

B. Special Excavation

The excavation necessary for placement of riprap around bridge piers is called Special Excavation (see Figure 11.2.6-6).

Special excavation shall be computed from the top of the seal to the existing stream bed or ground line along the slopes indicated in the Plans. Special excavation will only include excavation outside the limits of structure excavation.

The limits for special excavation shall be shown in the Plans.

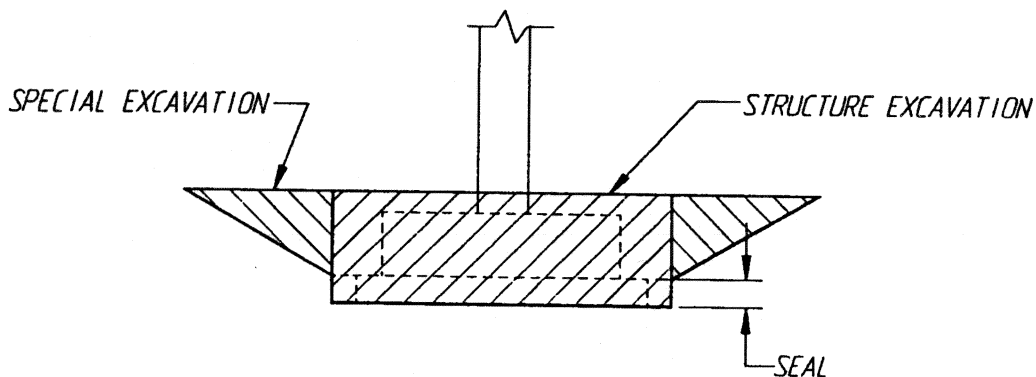


Figure 11.2.6-6

C. Shaft Excavation

Excavation necessary for the construction of shaft foundations is generally measured by the cubic yard and paid for at the unit contract price per cubic yard for "Soil Excavation for Shaft Including Haul."

The usual limits for computing shaft excavation shall be the neat lines of the shaft diameter and from the bottom elevation of the shaft as shown in the Plans to the ground surface as it exists at the time of shaft excavation.

The methods of measurement and payment and the limits for shaft excavation shall be specified in the Special Provisions.

11.2.6 Shoring or Extra Excavation, Class A

All excavation in the dry which requires workmen to enter the excavated area and which has a depth of 4 feet or more is required to be shored, unless the earth face is excavated at its angle of repose (Extra Excavation).

All excavation which is 15 feet or less from the edge of a traveled pavement is also required to be shored. All excavation adjacent to railroad tracks shall also be shored.

Cofferdams are required for all underwater excavation or excavation affected by ground water.

Shoring, cofferdams, or caissons or extra excavation required for the construction of bridge footings and reinforced concrete retaining walls constructed in the wet or dry is classified as Shoring or Extra Excavation, Class A.

For the purpose of estimating the cost for cofferdams or for shoring or extra excavation, Class A, it is necessary to compute the peripheral area of an assumed sheet pile enclosure of the excavated area.

While payment for Shoring or Extra Excavation, Class A, is made at a lump sum contract price, the costs are a function of overall height of excavation. In general, each side of the excavation for each pier shall be categorized into an average overall height range as shown on Form 230-031 (i.e., less than 6 feet, 6 to 10 feet, 10 to 20 feet, or greater than 20 feet), the area for the side computed using the appropriate width times the average overall height, the overall area for the side shall be entered in the category that matches the side's average overall height. These calculations are required for each pier of the bridge as applicable. See accompanying Figure 11.2.6-7 and sample calculation.

For excavation in the dry, the peripheral area shall be the perimeter of the horizontal limits of structure excavation times the height from the bottom of the footing to the ground surface at the time of excavation.

For excavation in water, the peripheral area shall be the perimeter of the horizontal limits of structure excavation times the height from the bottom of the seal to 2 feet above the seal vent elevation.

For shaft-type foundations, it is not necessary to compute the area for shoring because the cost for shoring is normally included in the contract price for shaft excavation.

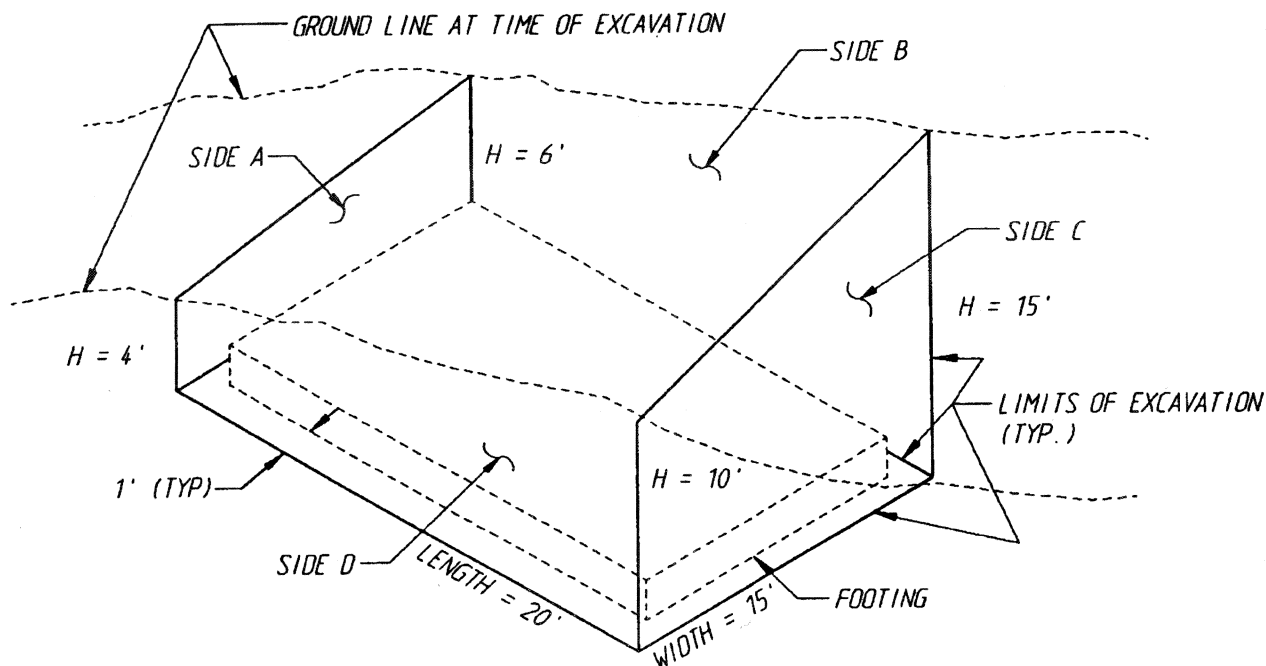


Figure 11.2.6-7

BRIDGE DESIGN MANUAL

Criteria

Quantities

Computation of Quantities

Sample Calculation:

For this pier (Figure 11.2.6-7):

Side A: average height = $(4 + 6)/2 = 5$ feet
width = 15 feet
area = $5 \times 15 = 75$ square feet

Side B: average height = $(6 + 15)/2 = 10.5$ feet
width = 20 feet
area = $10.5 \times 20 = 210$ square feet

Side C: average height = $(10 + 15)/2 = 12.5$ feet
width = 15 feet
area = $12.5 \times 15 = 187.5$ square feet

Side D: average height = $(4 + 10)/2 = 7$ feet
width = 20 feet
area = $7 \times 20 = 140$ square feet

For this example

| <i>height category</i> | <i>area</i> |
|------------------------|-------------------------------|
| less than 6 feet | 75 square feet |
| 6 feet to 10 feet | 140 square feet |
| 10 feet to 20 feet | $210 + 188 = 398$ square feet |
| greater than 20 feet | N.A. |

These numbers would be entered on Form 230-031 as follows:

| <i>Std. Item No.</i> | <i>Item Use</i> | <i>Item Description</i> | <i>Quant.</i> | <i>Unit of Meas.</i> |
|------------------------------|------------------------|--|----------------------------------|------------------------------|
| 4012 | Std. Item | Shoring or Extra Excavation, Class A Dry: | (Enter Total for Bridge Here) | L.S. |
| Average Overall Height | | | | |
| <i>Pier</i> | <i>6 ft.</i> | <i>6 ft. to 10 ft.</i> | <i>10 ft.* to 20 ft.</i> | <i>20 ft.*</i> |
| <u>Example</u> | <u>75</u> S.F. | <u>140</u> S.F. | <u>398(11.5*)</u> S.F. | <u>—</u> S.F. |
| <u> </u> | <u> </u> S.F. | <u> </u> S.F. | <u> </u> S.F. | <u> </u> S.F. |
| <u> </u> | <u> </u> S.F. | <u> </u> S.F. | <u> </u> S.F. | <u> </u> S.F. |
| <u> </u> | <u> </u> S.F. | <u> </u> S.F. | <u> </u> S.F. | <u> </u> S.F. |

*Indicate Average Height

11.2.7 Piling

The piling quantities are to be measured and paid for as outlined in Section 6-05.3(1)D Test Piles, and measurement and payment Sections 605.4 and 6-05.5 of the Standard Specifications. Computation of piling quantities shall follow the same provisions. Designers shall familiarize themselves with these sections of the Standard Specifications.

Timber test piles are driven outside the structure limits and are extra or additional piling beyond the required number of production piling.

Concrete or steel test piles are driven within the structure limits and take the place of production piling. In this case, the number of production piling is reduced by the number of test piling.

The quantity for "Furnishing _____ Piling _____" is the linear feet of production piling below cut-off to the "estimated" pile tip (not "minimum" tip) shown in the soils report. (Does not include test piles.)

The quantity for "Driving _____ Piling _____" is the number of production piling driven. (Does not include test piles.)

Pile tips are required if so stated in the soils report. The tips on the test piles are incidental to the test pile; therefore, the number of pile tips reported on the Bridge Quantities Form 230-031 should not include the number of pile tips required on the test piles.

DP:BDM11



**Washington State
Department of Transportation**
Environmental And Engineering Service Center
Bridge and Structures Office

Not Included In Bridge Quantities List

| | | | | |
|-------------------|------------|---------------|------|------------|
| SR | Job Number | Project Title | | |
| Designed By | | Checked By | Date | Supervisor |
| Type of Structure | | | | |

The following is a list of items for which the Bridge and Structures Office is relying on the Region to furnish plans, specifications and estimates.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.



**Washington State
Department of Transportation**
Bridge and Structures

Bridge Quantities

✓ Indicate Unit of Measure:
☐ English ☐ Metric

| St. Item No. | Item Use | Item Description | Quantity | Unit of Measure | | | | | | | | | | | | | | | | | | | |
|--------------------|---------------|---|---------------|-----------------|--------|-------------|-------------|-------------|---------------|-------------|---------------|-------------|-------------|---------------|-------|---------------|-------------|-------|---------------|-------|---------------|------------|--|
| 0001(E) 0001(M) | Std. Item | Mobilization | _____ | L.S. | | | | | | | | | | | | | | | | | | | |
| 0061 0061 | GSP Item | Removing Portion of Existing Bridge | _____ | L.S. | | | | | | | | | | | | | | | | | | | |
| | | Type _____ Area _____ SF/SM | | | | | | | | | | | | | | | | | | | | | |
| | | Drilled Holes: <i>Less than 12"/305 mm long:</i> <i>Greater than 12"/305 mm long:</i> | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="0"> <tr> <th>Number</th> <th>Diameter</th> <th>Number</th> <th>Diameter</th> <th>Length</th> </tr> <tr> <td>_____</td> <td>_____ Inch/mm</td> <td>_____</td> <td>_____ Inch/mm</td> <td>_____ LF/M</td> </tr> <tr> <td>_____</td> <td>_____ Inch/mm</td> <td>_____</td> <td>_____ Inch/mm</td> <td>_____ LF/M</td> </tr> <tr> <td>_____</td> <td>_____ Inch/mm</td> <td>_____</td> <td>_____ Inch/mm</td> <td>_____ LF/M</td> </tr> </table> | Number | Diameter | Number | Diameter | Length | _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | |
| Number | Diameter | Number | Diameter | Length | | | | | | | | | | | | | | | | | | | |
| _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | | | | | | | | | | | | | | | | | | | |
| _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | | | | | | | | | | | | | | | | | | | |
| _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | | | | | | | | | | | | | | | | | | | |
| | | Core Drilled Holes: <i>Less than 12"/305 mm long:</i> <i>Greater than 12"/305 mm long:</i> | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="0"> <tr> <th>Number</th> <th>Diameter</th> <th>Number</th> <th>Diameter</th> <th>Length</th> </tr> <tr> <td>_____</td> <td>_____ Inch/mm</td> <td>_____</td> <td>_____ Inch/mm</td> <td>_____ LF/M</td> </tr> <tr> <td>_____</td> <td>_____ Inch/mm</td> <td>_____</td> <td>_____ Inch/mm</td> <td>_____ LF/M</td> </tr> <tr> <td>_____</td> <td>_____ Inch/mm</td> <td>_____</td> <td>_____ Inch/mm</td> <td>_____ LF/M</td> </tr> </table> | Number | Diameter | Number | Diameter | Length | _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | |
| Number | Diameter | Number | Diameter | Length | | | | | | | | | | | | | | | | | | | |
| _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | | | | | | | | | | | | | | | | | | | |
| _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | | | | | | | | | | | | | | | | | | | |
| _____ | _____ Inch/mm | _____ | _____ Inch/mm | _____ LF/M | | | | | | | | | | | | | | | | | | | |
| 0071 0071 | GSP Item | Removing Existing Bridge | _____ | L.S. | | | | | | | | | | | | | | | | | | | |
| | | Type _____ Area _____ SF/SM | | | | | | | | | | | | | | | | | | | | | |
| | Sp. Prov. | Removing Temporary Structure | _____ | L.S. | | | | | | | | | | | | | | | | | | | |
| | | Type _____ Area _____ SF/SM | | | | | | | | | | | | | | | | | | | | | |
| 4006/8331 | Std. Item | Structure Excavation Class A Incl. Haul Unsuitable: | _____ | CY/M3 | | | | | | | | | | | | | | | | | | | |
| | | <table border="0"> <tr> <th>Pier</th> <th>Soil</th> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> </table> | Pier | Soil | _____ | _____ CY/M3 | _____ | _____ CY/M3 | _____ | _____ CY/M3 | _____ | _____ CY/M3 | | | | | | | | | | | |
| Pier | Soil | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| | | Cofferdam: | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="0"> <tr> <th>Pier</th> <th>Soil</th> <th>Rock</th> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> <td>_____ CY/M3</td> </tr> </table> | Pier | Soil | Rock | _____ | _____ CY/M3 | _____ CY/M3 | _____ | _____ CY/M3 | _____ CY/M3 | _____ | _____ CY/M3 | _____ CY/M3 | _____ | _____ CY/M3 | _____ CY/M3 | | | | | | |
| Pier | Soil | Rock | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | |
| 4010/8835 | GSP Item | Special Excavation | _____ | CY/M3 | | | | | | | | | | | | | | | | | | | |
| | | <table border="0"> <tr> <th>Pier</th> <th>Soil</th> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> <tr> <td>_____</td> <td>_____ CY/M3</td> </tr> </table> | Pier | Soil | _____ | _____ CY/M3 | _____ | _____ CY/M3 | _____ | _____ CY/M3 | _____ | _____ CY/M3 | | | | | | | | | | | |
| Pier | Soil | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |
| _____ | _____ CY/M3 | | | | | | | | | | | | | | | | | | | | | | |

BRIDGE DESIGN MANUAL

Appendix A

Quantities

Bridge Quantities Form

| St. Item No. | Item Use | Item Description | Quantity | Unit of Measure |
|--------------|-----------|---|----------|-----------------|
| 4013/4013 | Std. Item | Shoring or Extra Excavation Class A Dry: | | L.S. |
| | | AVERAGE OVERALL HEIGHT | | |
| | | <div style="display: flex; justify-content: space-between;"> Pier <6 ft./2 m 6 ft./2 m to 10 ft./3 m 10 ft./3 m to * 20 ft./6 m >20 ft./6 m * </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | Cofferdam: | | |
| | | AVERAGE OVERALL HEIGHT | | |
| | | <div style="display: flex; justify-content: space-between;"> Pier <6 ft./2 m 6 ft./2 m to 10 ft./3 m 10 ft./3 m to * 20 ft./6 m >20 ft./6 m * </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | <div style="display: flex; justify-content: space-between;"> SF/SM SF/SM SF/SM SF/SM SF/SM </div> | | |
| | | *INDICATE AVERAGE HEIGHT | | |
| 4030 | GSP Item | Rock Bolt | | Each |
| -- | Sp. Prov. | Soil Excavation For Shaft Including Haul | | CY/M3 |
| -- | Sp. Prov. | Rock Excavation For Shaft Including Haul | | CY/M3 |
| -- | Sp. Prov. | Furnishing and Placing Temp. Casing For _____ Diam. Shaft | | LF/M |
| -- | Sp. Prov. | Furnishing Permanent Casing For _____ Diam. Shaft | | LF/M |
| -- | Sp. Prov. | Placing Permanent Casing For _____ Diam. Shaft | | Each |
| -- | Sp. Prov. | Casing Shoring | | LF/M |
| -- | Sp. Prov. | Shoring or Extra Excavation Cl. A | | L.S. |
| -- | Sp. Prov. | CSL Access Tube | | LF/M |
| 4151/8426 | Std. Item | St. Reinf. Bar For Shaft | | LB/KG |
| -- | Sp. Prov. | Conc. Class 4000P For Shaft | | CY/M3 |
| -- | Sp. Prov. | Removing Obstructions | | Est. |
| -- | GSP Item | Excavation For Piling | | LF/M |
| 4055/8355 | Std. Item | Preboring For Pile | | LF/M |
| 4060/4060 | Std. Item | Furnishing and Driving Concrete Test Pile | | Each |
| 4070/8363 | Std. Item | Furnishing Concrete Piling - _____ Diameter | | LF/M |
| 4080/4080 | Std. Item | Driving Concrete Pile - _____ Diameter | | Each |
| 4085/4085 | Std. Item | Furnishing and Driving Steel Test Pile | | Each |
| 4090/8373 | Std. Item | Furnishing Steel Piling | | LF/M |
| 4095/4095 | Std. Item | Driving Steel Pile | | Each |
| 4100/4100 | Std. Item | Furnishing and Driving Timber Test Pile | | Each |
| 4105/8381 | Std. Item | Furnishing Timber Piling - Untreated | | LF/M |
| 4106/8383 | Std. Item | Furnishing Timber Piling - Creosote Treated | | LF/M |
| 4108/4108 | Std. Item | Driving Timber Pile - Untreated | | Each |
| 4110/4110 | Std. Item | Driving Timber Pile - Creosote Treated | | Each |
| 4116/4116 | Std. Item | Pile Splice - Timber | | Each |
| -- | Sp. Prov. | Pile Tip | | Each |

BRIDGE DESIGN MANUAL

Appendix A

Quantities

Bridge Quantities Form

| St. Item No. | Item Use | Item Description | Quantity | Unit of Measure |
|--------------|-----------|--|----------|-----------------|
| 4120/8393 | Std. Item | Furnishing Prestressed Hollow Concrete Piling _____ | _____ | LF/M |
| 4130/4130 | Std. Item | Placing Prestressed Hollow Concrete Pile _____ | _____ | Each |
| 4140/4140 | Std. Item | Driving Prestressed Hollow Concrete Pile _____ | _____ | Each |
| 4145/4145 | Sp. Prov. | Pile Loading Test No. of Tests _____ Each Pile Size _____ Ton/Tonne | _____ | LF/M |
| 4147/8410 | Std. Item | Epoxy-Coated St. Reinf. Bar For _____ | _____ | LB/KG |
| 4147/8410 | Std. Item | Epoxy-Coated St. Reinf. Bar For Traffic Barrier | _____ | LB/KG |
| 4148/8412 | Std. Item | Epoxy-Coated St. Reinf. Bar For Bridge | _____ | LB/KG |
| 4149/8420 | Std. Item | St. Reinf. Bar For Bridge | _____ | LB/KG |
| 4151/8426 | Std. Item | St. Reinf. Bar For Traffic Barrier | _____ | LB/KG |
| 4151/8426 | Std. Item | St. Reinf. Bar For _____ | _____ | LB/KG |
| 4165/8428 | Std. Item | Wire Mesh _____ | _____ | SY/SM |
| 4166/8430 | Std. Item | Lean Concrete _____ | _____ | CY/M3 |
| -- | GSP Item | Conc. Class _____ | _____ | CY/M3 |
| 4322/8452 | Std. Item | Conc. Class 4000/28 for Bridge | _____ | CY/M3 |
| 4202/8442 | Std. Item | Conc. Class 4000/28 for Traffic Barrier | _____ | CY/M3 |
| 4202/8442 | Std. Item | Conc. Class 4000/28 for _____ | _____ | CY/M3 |
| 4320/8441 | Std. Item | Conc. Class 3000/20 for Bridge | _____ | CY/M3 |
| 4200/8440 | Std. Item | Conc. Class 3000/20 for _____ | _____ | CY/M3 |
| 4325/8477 | Std. Item | Conc. Class 5000/35 for Bridge | _____ | CY/M3 |
| 4205/8475 | Std. Item | Conc. Class 5000/35 for _____ | _____ | CY/M3 |
| 4324/8468 | Std. Item | Conc. Class 4000W/28W for Bridge | _____ | CY/M3 |
| 4204/8466 | Std. Item | Conc. Class 4000W/28W for _____ | _____ | CY/M3 |
| 4183/4183 | GSP Item | Conc. Class EA | _____ | CY/M3 |
| 4185/4185 | GSP Item | Conc. Class HE | _____ | CY/M3 |
| -- | Std. Item | Conc. Class _____ LS | _____ | CY/M3 |
| 4184/4184 | GSP Item | Cylinder Concrete | _____ | CY/M3 |
| 4188/4188 | GSP Item | Fractured Fin Finish | _____ | SY/SM |
| 4230/4230 | Std. Item | Structural Carbon Steel | _____ | LB/KG |
| 4235/4235 | Std. Item | Structural Low Alloy Steel | _____ | LB/KG |
| 4240/4240 | Std. Item | Structural High Strength Steel | _____ | LB/KG |
| 4246/4536 | Std. Item | Cast Steel | _____ | LB/KG |
| 4251/8540 | Std. Item | Forged Steel | _____ | LB/KG |
| 4256/8546 | Std. Item | Cast Iron | _____ | LB/KG |
| 4261/8549 | Std. Item | Malleable Iron | _____ | LB/KG |
| 4267/8552 | Std. Item | Ductile Iron | _____ | LB/KG |
| 4271/8555 | Std. Item | Cast Bronze | _____ | LB/KG |

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Appendix A

Quantities

Bridge Quantities Form

| St. Item No. | Item Use | Item Description | Quantity | Unit of Measure |
|--------------|-----------|---------------------------------------|----------|-----------------|
| 4280/8560 | Std. Item | Timber and Lumber - Untreated | _____ | MBM/M3 |
| 4282/8582 | Std. Item | Timber and Lumber - Creosote Treated | _____ | MBM/M3 |
| 4284/8584 | Std. Item | Timber and Lumber - Salts Treated | _____ | MBM/M3 |
| 4300/4300 | Std. Item | Superstructure | _____ | LS |
| | | Bridge Plan Area _____ SF/SM | _____ | |
| 4311/4311 | Std. Item | Roadway Deck | _____ | LF/M |
| | | Bridge Plan Area _____ SF/SM | _____ | |
| 4390/8595 | GSP Item | Electrical Conduit | _____ | LF/M |
| | | Diameter _____ Inch Length _____ LF/M | _____ | |
| 4400/8600 | GSP Item | Steel Handrail | _____ | LF/M |
| 4405 | GSP Item | Bridge Rail - Low Fence Type | _____ | LF/M |
| 4406 | GSP Item | Bridge Rail - High Fence Type | _____ | LF/M |
| 4410/8605 | GSP Item | Bridge Railing Type _____ | _____ | LF/M |
| 4420 | GSP Item | Bridge Grate Inlet | _____ | Each |
| 4453/4453 | GSP Item | Pigmented Sealer | _____ | SY/SM |
| 7169/9572 | Sp. Prov. | Structural Earth Wall | _____ | SF/SM |
| -- | Sp. Prov. | _____ | _____ | _____ |
| -- | Sp. Prov. | _____ | _____ | _____ |

Breakdown of Items for Superstructure or Roadway Deck

| St. Item No. | Item Use | Item Description | Quantity | Unit of Measure |
|--------------|-----------|--|----------|-----------------|
| -- | Std. Item | Epoxy-Coated Steel Reinforcing Bar | _____ | LB/KG |
| -- | Std. Item | Epoxy-Coated Steel Reinforcing Bar (Traffic Barrier) | _____ | LB/KG |
| -- | Std. Item | Steel Reinforcing Bar | _____ | LB/KG |
| -- | Std. Item | Steel Reinforcing Bar (Traffic Barrier) | _____ | LB/KG |
| -- | GSP Item | Conc. Class _____ | _____ | CY/M3 |
| -- | Std. Item | Conc. Class 4000D/28D | _____ | CY/M3 |
| -- | Std. Item | Conc. Class 4000/28 | _____ | CY/M3 |
| -- | Std. Item | Conc. Class 4000/28 (Traffic Barrier) | _____ | CY/M3 |
| -- | Std. Item | Conc. Class 5000/35 | _____ | CY/M3 |
| -- | Std. Item | Conc. Class _____ LS | _____ | CY/M3 |
| -- | GSP Item | Fractured Fin Finish | _____ | SY/SM |
| -- | Std. Item | Structural Carbon Steel | _____ | LB/KG |
| -- | Std. Item | Structural Low Alloy Steel | _____ | LB/KG |
| -- | Std. Item | Structural High Strength Steel | _____ | LB/KG |
| -- | Std. Item | Cast Steel | _____ | LB/KG |
| -- | Std. Item | Forged Steel | _____ | LB/KG |
| -- | Std. Item | Cast Iron | _____ | LB/KG |
| -- | Std. Item | Malleable Iron | _____ | LB/KG |
| -- | Std. Item | Ductile Iron | _____ | LB/KG |
| -- | Std. Item | Cast Bronze | _____ | LB/KG |
| -- | Std. Item | Timber and Lumber - Untreated | _____ | MBM/M3 |
| -- | Std. Item | Timber and Lumber - Creosote Treated | _____ | MBM/M3 |
| -- | Std. Item | Timber and Lumber - Salts Treated | _____ | MBM/M3 |
| -- | Sp. Prov. | Glulam Deck Panels | _____ | MBM/M3 |
| -- | Std. Item | Electrical Conduit | _____ | LF/M |
| | | Diameter _____ Inch Length _____ LF/M | _____ | |
| -- | GSP Item | Steel Handrail | _____ | LF/M |
| -- | GSP Item | Bridge Rail - Low Fence Type | _____ | LF/M |
| -- | GSP Item | Bridge Rail - High Fence Type | _____ | LF/M |
| -- | Std. Item | Bridge Railing Type _____ | _____ | LF/M |
| -- | GSP Item | Traffic Barrier | _____ | LF/M |
| 4430/4430 | GSP Item | Special Bridge Drain | _____ | Each |
| 4433/4433 | Sp. Prov. | Modify Bridge Drain | _____ | Each |
| 4434/4434 | Sp. Prov. | Plugging Existing Bridge Drain | _____ | Each |
| 4420/4420 | GSP Item | Bridge Grate Inlet | _____ | Each |

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Appendix A

Quantities

Bridge Quantities Form

| St. Item No. | Item Use | Item Description | Quantity | Unit of Measure |
|--------------|-----------|--|----------|-----------------|
| -- | GSP Item | Expansion Joint System | | LF/M |
| | | Type _____ Length _____ LF/M | | |
| | | Type _____ Length _____ LF/M | | |
| | | Type _____ Length _____ LF/M | | |
| 4444/8634 | Sp. Prov. | Expansion Joint Modification | | LF/M |
| | | Type _____ Length _____ LF/M | | |
| 4232/8515 | Sp. Prov. | Modified Concrete Overlay | | CF/M3 |
| 4233/8516 | Sp. Prov. | Finishing and Curing Modified Concrete Overlay | | SY/SM |
| 4456/8644 | Sp. Prov. | Scarifying Concrete Surface | | SY/SM |
| | Sp. Prov. | Polymer Concrete Overlay | | SY/SM |
| | Sp. Prov. | Further Deck Preparation | | L.S. |
| | | Volume _____ CF/CM Avg. Depth _____ Inch/mm | | |
| 4445/4445 | GSP Item | Bridge Deck Repair | | L.S. |
| | | Volume _____ CF/CM Avg. Depth _____ Inch/mm | | |
| -- | GSP Item | Pigment Sealer | | SY/SM |
| 4455/8643 | GSP Item | Membrane Waterproofing (Deck Seal) | | SY/SM |
| -- | Sp. Prov. | Pot Bearing | | Each |
| -- | Sp. Prov. | Disc Bearing | | Each |
| -- | Sp. Prov. | Spherical Bearing | | Each |
| -- | Sp. Prov. | Cylindrical Bearing | | Each |
| -- | Std. Item | Elastomeric Bearing Pad | | Each |
| -- | GSP Item | Fabric Pad Bearing | | Each |
| -- | Std. Item | Prestressed Conc. Girder Series W42G/W42MG | | LF/M |
| -- | Std. Item | Prestressed Conc. Girder Series W50G/W50MG | | LF/M |
| -- | Std. Item | Prestressed Conc. Girder Series W58G/W58MG | | LF/M |
| -- | Std. Item | Prestressed Conc. Girder Series W74G/W74MG | | LF/M |
| -- | Std. Item | Prestressed Conc. Girder Series W83G/W83MG | | LF/M |
| -- | Std. Item | Prestressed Conc. Girder Series W95G/W95MG | | LF/M |
| -- | Std. Item | Prestressing | | LB/KG |
| -- | Sp. Prov. | Precast Prestressed Slab | | SF/SM |
| | | Volume _____ CF/CM Length _____ LF/M | | |
| -- | Sp. Prov. | Precast Prestressed Tri Beam | | SF/SM |
| | | Volume _____ CF/CM Length _____ LF/M | | |
| -- | Sp. Prov. | Precast Prestressed Double Tee Beam | | SF/SM |
| | | Volume _____ CF/CM Length _____ LF/M | | |
| -- | Sp. Prov. | Precast Segment | | LF/M |
| | | Volume _____ CY/CM | | |
| -- | Sp. Prov. | | | |
| -- | Sp. Prov. | | | |